

WE CLAIM:

1. A process for producing an article comprising:
  - (a) fluidizing a starting material;
  - 5 (b) forcing the fluidized starting material toward the article, the article having a certain temperature; and
    - (c) passing the fluidized starting material through a high energy zone, the passing step can occur before the forcing step; after the forcing step but before the fluidizing material comes in contact with the surface of the article; and/or after the
  - 10 forcing step and after the fluidized material comes in contact with the surface of the article,  
whereby the finished article has nano-scaled structures distributed in the surface of the article and/or at least partially embedded in the article.

15 2. The process according to claim 1 said fluidizing is accomplished via atomizing the starting material into an aerosol; evaporating the starting material into a gas phase; or subliming the starting material into a gas phase.

20 3. The process according to claim 2 said fluidizing is accomplished via atomizing the starting material into an aerosol.

4. The process according to claim 1 wherein the starting material is selected from the group comprising organometallics or solutions thereof; inorganic salts; or metal oxides or suspensions thereof.

25 5. The process according to claim 1 wherein the forcing the fluidized material toward the surface of the article is accomplished using a moving gas stream.

30 6. The process according to claim 1 wherein the temperature of the surface of the article is between 25°F and 3000°F.

7. The process according to claim 1 wherein the article is selected from the group comprising polymers, glass, and ceramics.

8. The process according to claim 7 wherein the article is glass.

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9. The process according to claim 8 wherein the temperature of the surface of the article is between 700°F and 2100°F.

10. The process according to claim 1 wherein the high energy zone is selected  
10 from the group comprising hot wall reactors, CVPD reactors, combustion deposition  
reactors, plasma chambers, and laser beams.

11. The process according to claim 10 wherein the high energy zone is a hot wall  
reactor.

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12. The process according to claim 1 wherein the size of the nano-scaled  
structures in the finished article are spherical.

13. The process according to claim 1 wherein the nano-scaled structures in the  
20 finished article are in contact with each other.

14. The process according to claim 1 further comprising adding a coating layer to  
the article after the nano-scaled structure comes in contact with the surface of the  
article.

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15. The process according to claim 1 further comprising heating the finished  
article.

16. The process according to claim 15 wherein the nano-scaled structures on the  
30 surface of the article and/or at least partially embedded in the article are at least  
partially dissolved.

17. A process for producing an article comprising:

- (a) fluidizing an organometallic solution by atomizing the organometallic solution into an aerosol;
- 5 (b) forcing the fluidized starting material toward the article using a moving gas stream, the article having a temperature between 700°F and 2100°F; and
- (c) passing the fluidized starting material through a hot wall reactor before the forcing step,

10 whereby the finished article has nano-scaled structures distributed in the surface of the article and/or at least partially embedded in the article.

18. A three dimensional article comprising nano-scaled structures distributed on the surface of the article and/or at least partially embedded in the article.

15 19. The article of claim 18 wherein the article is selected from the group comprising polymers, glass, and ceramics.

20. The article of claim 19 wherein the article is glass.

20 21. The article of claim 18 wherein the nano-scaled structures are solid.

22. The article of claim 18 wherein the nano-scaled structures spherical.

23. The article of claim 18 wherein the aspect ratio of nano-structures is 1:1 to

25 1:500.

24. The article of claim 18 wherein the color of the article with nano-scaled structures is different than the same article without nano-scaled structures.

30 25. The article of claim 18 wherein the article with nano-scaled structures is harder than same article without nano-scaled structure.

26. The article of claim 18 wherein the catalytic or photocatalytic of the article with nano-scaled structures is better than the same article without nano-scaled structure.

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27. The article of claim 18 wherein the texture of the article with nano-scaled structures is different from the same article without nano-scaled structures.

28. The article of claim 18 wherein the conductivity of the article with nano-scaled structures is greater than the same article without nano-scaled structures.

10 29. The article of claim 18 wherein the water contact angle of the article with nano-scaled structures is different from the same article without nano-scaled structures.

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